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09/769,599	01/25/2001	Dina Kravets	SAR 13896	4399

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EXAMINER

BHATNAGAR, ANAND P

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 02/25/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/769,599

Applicant(s)

KRAVETS ET AL.

Examiner

Anand Bhatnagar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 14-25 is/are rejected.
- 7) ☒ Claim(s) 11-13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 10, 14, 16, 17, and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Vinod et al. ("Video Shot Analysis using Efficient Multiple Object Tracking", V.V. Vinod and Hiroshi Murase, NTT Basic Research Labs, 3-1 Morinosato-Wakamiya Atsugi-shi, Kanagawa, 243-01 Japan, IEEE, 1991).

Regarding claim 1: A method for performing motion analysis on a sequence of images, where said sequence of images captures a plurality of objects each moving along a trajectory in an imaged area, said method comprising (page 501 under section #2 1<sup>st</sup> paragraph, where motion analysis is performed wherein multiple motions are determined of multiple objects from successive video frames):

extracting motion information for each of said plurality of objects contained in said sequence of images (page 504 section 3.2, where the motion of multiple objects is determined and their respective trajectories determined); and

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determining spatial patterns from said extracted motion information (page 504 section 3.2, where a trajectory map is determined of the multiple trajectories that are determined. The trajectory map is read as the spatial patterns.).

Regarding claims 2 and 16: The method wherein said determining of spatial patterns comprises:

determining a route comprising a trajectory of a first object having the same trajectory of at least one other object.

Vinod et al. discloses to obtain motion parameters for multiple moving objects within a video sequence. Vinod et al. further discloses to obtain a trajectory of each moving object and to get the start and ending positions of each object's trajectory. Vinod et al. does not teach to obtain a trajectory of a first object having the same trajectory of at least one other object. Vinod discloses to obtain the trajectories of each object's motion and their respective start and ending positions and to generate a trajectory map from this data (section 3.2). Inherently, one skilled in the art can analyze this trajectory map obtain information such as how many objects are moving, which ones start and/or end at the same positions, which ones have the same/different trajectories, etc.

Regarding claim 3: It is rejected for the same reason as claim 2 and for the following limitations of:

determining whether said trajectory of a second object is within a threshold distance said trajectory of said first object (section 3.1 2<sup>nd</sup> paragraph);  
and

including, if said trajectory of said second object is within the threshold distance, said trajectory of said second object in said route (section 3.1 2<sup>nd</sup> paragraph).

Regarding claim 4: The method wherein said determining of spatial patterns comprises:

determining a source point "start" and a destination point "end" from said trajectory of said plurality of objects (section 3.2, where the start "source" and end "destination" positions of the trajectories are determined).

Regarding claim 5: It is rejected for the same reason as claim 2 and for the following limitations of:

determining whether a number of trajectories originating from a location is greater than a threshold number; and

identifying, if the number of trajectories originating from the location is greater than the threshold number, the location as said source point.

Vinod et al. discloses to determine a map of all the trajectories obtain of all the moving objects in a video sequence. Vinod further analyzes for the start and end positions of each trajectory and to use thresholding to acquiring objects that are within a close proximity to each other. Vinod et al. does not teach to have a threshold set for a number of trajectories starting from a certain location and to set this as a source point if the number of trajectories starting at the same point is above the threshold. Inherently one skilled in the art can analyze a trajectory map to see how many start at the same place or end up at the same place since the

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start and end positions of each trajectory is determined and to label them as preferred, such as source point, beginning point, start point, etc. Thresholding is a well known concept in image processing and examiner takes Official Notice.

Regarding claim 6: It is rejected for the same reason as claim 2 and for the following limitations of:

determining whether a number of trajectories ending at a location is greater than a threshold number; and

identifying, if the number of trajectories ending at the location is greater than the threshold number, the location as said destination point.

Vinod et al. discloses to determine a map of all the trajectories obtain of all the moving objects in a video sequence. Vinod further analyzes for the start and end positions of each trajectory and to use thresholding to acquiring objects that are within a close proximity to each other. Vinod et al. does not teach to have a threshold set for a number of trajectories ending at a certain location and to set this as a destination point if the number of trajectories ending at the same point is above the threshold. Inherently one skilled in the art can analyze a trajectory map to see how many start at the same place or end up at the same place since the start and end positions of each trajectory is determined and to label them as preferred, such as end point, finish point, destination point, etc. Thresholding is a well known concept in image processing and examiner takes Official Notice.

Regarding claim 7: It is rejected for the same reason as claim 2 above and for the following limitations of: wherein said source point and said destination

point are determined using a clustering process. Examiner takes Official Notice because the method of clustering is well known in image processing such as for locating objects in an image(s).

Regarding claim 8: The method further comprising:

determining spatio-temporal patterns from said determined spatial patterns along a time dimension (section 3.1 last paragraph and section 3.2, where the trajectories "spatial patterns" are determined in time and a trajectory map "spatio-temporal patterns" produced.

Regarding claim 10: wherein said determining of spatio-temporal patterns comprises: determining a periodicity of at least one trajectory in said route.

It is rejected for the same reasons as claims 2 and 8 combined.

Regarding claim 14:

determining whether said trajectory in said first route is time correlated with said trajectory in said second route.

It is rejected for the same reasons as claims 2 and 8 combined.

Regarding claim 17: It is inherent that the video signal needs to transmit the signal from a video camera to an apparatus which analyzes data in the video images, such as motion since a video camera usually does not analyze images for motion.

Regarding claims 19 and 20: It is rejected for reasons of the combination of claims 2 and 16.

Regarding claim 21: It is rejected for the same reasons in claim 8.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A.) Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vinod et al. ("Video Shot Analysis using Efficient Multiple Object Tracking", V.V. Vinod and Hiroshi Murase, NTT Basic Research Labs, 3-1 Morinosato-Wakamiya Atsugi-shi, Kanagawa, 243-01 Japan, IEEE, 1991) and Weil et al. (U.S. patent 6,177,885 B1).

Regarding claim 9: The method wherein said determining of spatio-temporal patterns comprises: determining a busy time for said route, where the busy time represents a time when a number of trajectories for said plurality of objects along said route is greater than a threshold number.

Vinod et al. discloses to obtain motion parameters for multiple moving objects within a video sequence. Vinod et al. does not teach to determine the busy time for a route. Weil et al. teaches to obtain the busy time or day for a route of moving objects (read as "traffic flow") (Weil et al. col. 3 lines 2-5, 12-15, and 22-30, and col. 4 lines 55-60). It would have been obvious to one skilled in the art to combine the teaching of Weil et al. to that of Vinod et al. because they are analogous in monitoring the movement of moving objects using a video sequence. One in the art would have been motivated to incorporate the teaching



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of Weil et al. to that of Vinod et al. in order to detect the occurrence of accidents (Weil et al.; col. 2 lines 40-44).

B.) Claims 15, 18, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vinod et al. ("Video Shot Analysis using Efficient Multiple Object Tracking", V.V. Vinod and Hiroshi Murase, NTT Basic Research Labs, 3-1 Morinosato-Wakamiya Atsugi-shi, Kanagawa, 243-01 Japan, IEEE, 1991) and Cheng et al. ("Querying Video Contents by Motion Example", Pu-Jien Cheng and Wei-Pang Yang, Department of Computer and Information Science, National Chiao Tung University, Hsinchin, Taiwn, R.O.C., IEEE, 2000)

Regarding claims 15, 18, and 22: They are rejected for the same reasons as claim 2 above. As for the following limitations of performing a query from a plurality of patterns stored on a database and for displaying the results.

Vinod et al. discloses to obtain trajectories of all the moving objects in a video sequence. Vinod et al. does not teach to perform a query of these trajectories which are stored in a database and to display the results. Cheng et al. teaches to perform an image query of trajectory(s), of objects in motion, in a video sequence stored in a database (Cheng et al.; page 287 abstract, page 288 section 2.1, section 3, section 4.2, and section 4.3). It would have been obvious to one skilled in the art to combine the teaching of Cheng et al. to that of Vinod et al. because they are analogous in observing trajectories of moving objects in a video sequence. One in the art would have been motivated to incorporate the

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teaching of Cheng et al. to the system of Vinod et al. in order to obtain data about a specific object(s) in motion, such as it's trajectory, speed, angle of motion, etc.

Regarding claims 23 and 24: They are rejected for the same reasons as claim 2 above.

Regarding claim 25: It is rejected for the same reasons as claim 8 above.

### ***Allowable Subject Matter***

3. Claims 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Paretti (U.S. patent 4,025,718) for storing trajectories.

Boeck et al. (U.S. patent 4,622,458) for close object tracking.

### ***Contact Information***

5. Any inquiry into this communication should be directed to Anand Bhatnagar whose telephone number is 703-306-5914, whose supervisor is

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Amelia Au whose number is 703-308-6604, group receptionist is 703-305-4700,  
and group fax is 703-872-9306.

AB

Anand Bhatnagar

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February 12, 2004



SAMIR AHMED  
PRIMARY EXAMINER